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Aim :- Analysis of reference tracking controller with feed forward gain using ODE

Apparatus Required : pc(Windows), Asus zenbook, scilab 6.1.1

Theory :

ODE solves explicit ordinary differential equation defined by :

$$\frac{dy}{dt} = f(t, y)$$
$$y(t_0) = y_0$$

We describe the use of ODE for standard explicit ODE system. The simplest call of ODE is $y = ode(y_0, t_0, t, f)$ where y_0 is the vector of initial condition, t_0 is the initial time, t is the vector of times at which the solution y is computed and y is matrix of solution vector

$$y = [y(t1)), y(t(2)), \ldots)$$

The input argument f defines the right hand side of the first order differential equation. This argument is a function with a specific header.

If F is a scilab function, its syntax must be

$$y\,sol = f(t, y)$$

Th

Result :- The result of this experiment is visible in the graph shown in the previous page. In the graph, h, h_1, h_2, h_3 and y for original system, for controlling system and the tracking system is varying with the time (initial till t = final

Observation : The solution of second and third-order differential equation which is plotted and calculated and its controller.

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and tracking also plotted and calculated using scilab with the ODE method called ordinary differential method to find the soln of differential equation

We see in the plot obtained from scilab of problem 1, 2 and 3 is stable and problem 4 is unstable from correct to stable system.

Conclusion: From this experiment we concluded that by designing a reference tracking controller we can easily track the input in the output just by using a extra block N as shown in the fig of experiment 5.

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AIM :→ Familarization with PLC and learn the basics of ladder logic programming

Apparatus Required : PC (Windows 11), Asus zenbook, PLC simulator online

Theory :→ A PLC (Programing logic controller) is an industrial computer used for automation of electromechanical process, such as control of machinery on factory assembly lines, amusement rides, or light fixtures PLC's are expected to work flawlessly for years in industrial environments that are hazardious to the very microelectronic components that gives modern PLC's their excellent flexibility and precesion.

Prior to PLCs many of these control tasks were solved with contractor or relay controls. this is often referred to as hard wired control. Circuit diagrams had to be designed electrical components specified and installed and wiring lists created. Electricians would then wire the components necessaryt perform a specific task. If an error was made the wires had to be reconnected correctly. A change in function or system expansion required extensive component changes and rewiring Before start PLC it's convenient to know and understand its architecture see fig 1

As shown in fig 1 PLC consists of following parts

① Power Supply :→ Provides the voltage needed to run the primary PLC components

② I/O modules : provides signal conversion and isolation between the internal logic-level signals inside the PLC

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And fields high level signal.

(3) Processor System: provides intelligence to command and govern the activities of the entire PLC system.

(4) Programming Device: used to enter the desired program that will determine the sequence of operation.

Given Problems:

1. Design the circuit of starter of Motor

2. ~~Design~~ Design the circuit of traffic light in which the red light turns on for 15 sec, yellow light turn for 5 sec and for given light turn on for 10 sec.

3. Design the circuit of LED blinking for 4 sec.

Observation: Our starter of Motor designed in the PLC is working same as our motor starters at home. When we on the start button of the starter then it starts the motor and keeping running till stop button is pressed once the motor reached its running state then no matter how many times we press the start button, the motor keeps running.

In traffic light experiment, the red light will turn on for 15 sec then the yellow light will on for 5 sec and then the green light for the next to 10 sec and cycle of turning different light will be continued unless any disturbance in the circuit.

Now LED blinking circuit designed using PLC blinks at an interval of 4 sec that is for first 4 sec and the LED is ON and

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